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NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of:

Inventor: Brig Barnum ELLIOTT

For: METHOD, APPARATUS AND PROGRAM FOR PROVIDING USER-SELECTED ALERTING SIGNALS IN TELECOMMUNICATIONS DEVICES

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Enclosed are:

[71]	pages of specification and cover sheet
[40]	pages of claims
[1]	page of abstract
[7]	sheets of formal drawings.
[2]	pages of declaration and power of attorney.
[2]	pages of assignment and assignment recordation form
[-]	pages of information disclosure statement
[-]	page of USPTO form 1449
[-]	reference
[1]	return postcard

CLAIMS AS FILED			
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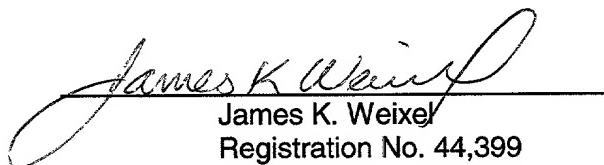
James K. Weixel
Registration No. 44,399
Attorney for Applicant(s)

Verizon Services Group
600 Hidden Ridge Road HQE03G13
Irving, TX 75038
Phone: (781) 466-2220
Fax: (781) 466-4021

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4

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UNITED STATES PATENT APPLICATION

OF

Brig Barnum ELLIOTT

FOR

METHOD, APPARATUS AND PROGRAM FOR PROVIDING USER-
SELECTED ALERTING SIGNALS IN TELECOMMUNICATIONS DEVICES

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to user communication

5   devices, and in particular to a method, apparatus, and

program for providing user-selected alerting signals in

telephones and other user communication devices.

2. Related Art

Conventional telephones typically generate some type of

10 alerting signal, such as a ringing tone, in response to

receiving an incoming call signal, to alert the user of the

receipt of a call. Typically, a telephone is capable of

generating only one type of ringing signal, and generates

that signal whenever a call from any source device is

15 received. With such conventional telephones, therefore, the

user has no idea who the calling party is until he or she

picks up the handset and the calling party identifies

itself.

In the past several years, caller identification systems

20 have been developed, to inform users of the identity of a

calling party before a conversation begins. Such caller

identification systems process the incoming call signal to

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determine the calling telephone number and/or the actual

identity (such as the name) of the calling party, and

present that information to the user on a visual display,

such as a liquid crystal display. When the phone rings to

5   indicate the receipt of the call, the user typically walks

to the phone, looks at the display and makes a determination

as to whether her or she wants to pick up the handset and

have a conversation with the caller.

A primary drawback of such caller identification devices,

10   however, stems from the use of a visual display to convey

information. More specifically, because those systems

present the identification information in a completely

visual, rather than audible, format, they require the user

to be at the telephone or at least in close enough of a

15   proximity to view the display, in order to know who is

calling. Thus, a called party who is, for example, watching

television in the living room, and whose telephone is in the

kitchen, would need to get up, walk to the telephone, and

look at the display, perhaps only to determine that he or

20   she does not want to take that call in the first place.

Such occurrences can be frustrating and annoying to the

user.

At least some telephones and Private Branch Exchanges (PBX)

equipment have the capability to enable very crude audible

caller identification. For example, some private network

telephones (such as telephones used in an office

5   environment) generate one type of ringing sequence (such as

a single ring) in response to calls received from equipment

located in the network, and another type of ringing sequence

(such as two very close temporally- spaced rings) in

response to calls being received from equipment located

10   outside of the network. By recognizing the ringing

sequence, the called party can discern if the call is an

"inside" or "outside" call. In some cases, office

telephones are configured to both ring in different

sequences for inside and outside calls, and to visually

15   display the name and/or number of the calling party. The

caller audible identification enabled by such systems,

however, is extremely rudimentary, in that it distinguishes

only between inside and outside calls, and does not give any

further indication as to the identity of the calling party.

20   There therefore exists a need for a new caller

identification technique that takes an entirely fresh

approach, and uses audible signals to identify calling

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parties which a much greater level of specificity than the

prior, out-dated systems discussed above.

SUMMARY OF THE INVENTION

It is an object of this invention to provide a method,

5   apparatus, and program for enabling a calling source to be

identified at a receiving device, by generating a particular

type of audible alerting signal at the receiving device, in

response to receiving an incoming call signal from the

calling source.

10   It is another object of this invention to provide a method,

apparatus, and program for enabling a party to select a type

of alerting signal to be generated at a receiving device in

response to the receiving device receiving an incoming call

signal from a particular calling source.

15   It is a further object of this invention to provide a

method, apparatus, and program for enabling a user-selected

alerting signal to be generated at a receiving device when a

call signal from a particular calling source is received by

that receiving device.

20   Further objects and advantages of this invention will become

apparent from a consideration of the drawings and ensuing

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description.

The foregoing and other problems are overcome and the
objects of the invention are realized by a method for
operating a user communication system, and a program and
5   communication system that operate in accordance with that
method.

In accordance with one embodiment of the invention, the
communication system comprises a plurality of user
communication devices, and the method comprises a step of
10 providing a digital representation of a corresponding
audible signal in each of a plurality of memory locations of
a memory of a first one of user communication devices. A
next step includes forwarding a call signal from a second
one of the user communication devices towards the first user
15 communication device. After the call signal is eventually
received at the first user communication device, further
steps are performed of selecting one of the memory
locations, and generating the audible signal represented by
the digital representation stored in the selected memory
20 location.

Each digital representation may be provided in the memory of
the first user communication device using various

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techniques. For example, an audible signal may be applied

to an input of a microphone of the device, for causing the

microphone to generate a corresponding analog signal, which

is then converted to digital form by an A/D converter and

5   stored in the memory. Also by example, a digital

representation of an audible signal may be downloaded to the

first user communication device from a database included in

a network which is in communication with the device, or may

be downloaded directly to the device from an external audio

10 source coupled to the device.

The selection of the memory locations preferably is

performed based on some predetermined criteria, such as a

time/date at which the call is received, information pre-

programmed into the device, a telephone number included in

15 the received call signal, etc.

In accordance with another embodiment of this invention, a

method comprises steps of providing a digital representation

of an audible signal in a memory of a first user

communication device, and forwarding a call signal that

20 includes the digital representation towards a second user

communication device. Thereafter, when the call signal is

eventually received at the second user communication device,

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a further step is performed of generating the audible signal

represented by the digital representation included in the

received call signal.

In accordance with another embodiment of this invention,

5   information (e.g., a telephone number) identifying the

calling source is extracted from the received call signal in

the second user communication device, and is then compared

with pre-stored information to determine if the receiving

device is authorized to generate the audible signal

10   represented by the received digital representation. This

procedure prevents the device from generating, for example,

sounds which the user may not wish to hear, such as, for

example, commercial advertisements.

Any suitable types of user communication device may be used

15   in this invention, such as, for example, a telephone, a

radiotelephone, an information appliance, or a pager.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be more readily understood from a

detailed description of the preferred embodiments taken in

20   conjunction with the following figures:

Fig. 1 is a block diagram of a communication system that is

suitable for practicing this invention.

Figs. 2a is a block diagram of a user communication terminal of the system of Fig. 1, wherein the terminal is constructed and operated in accordance with this invention.

5   Figs. 2b and 2c show data tables T1 and T2, respectively, that form a portion of a memory of one or more user communication devices of the system of Fig. 1.

Fig. 2d is a block diagram of a user information appliance of the system of Fig. 1, wherein the appliance is

10   constructed and operated in accordance with this invention.

Figs. 3a and 3b are a logical flow diagram of a method for enabling a user to select a type of alerting signal which he desires to be employed at a receiving communication device when an incoming call signal is received at the device, in

15   accordance with this invention.

Figs. 3c is a logical flow diagram of a procedure executed during the performance of the method of Figs. 3a and 3b, according to another embodiment of this invention.

Figs. 4a and 4b are a logical flow diagram of another method

20   in accordance with this invention, wherein the portion of

the method shown in Fig. 4b enables an alerting signal

selected by a user during the performance of the method of

Figs. 3a, 3b, or 4a, to be generated at a receiving

communication device when an incoming call signal is

5   received at that device.

Fig. 5 shows a logical flow diagram of a method for

normalizing acoustic information entered into a user

communication device of the system of Fig. 1, during the

performance of the methods of Figs. 3a, 3b, 4a, and 4b.

10 Identically labeled elements appearing in different ones of

the figures refer to the same elements but may not be

referenced in the description for all figures.

DETAILED DESCRIPTION OF THE
PREFERRED EMBODIMENTS

15 Fig. 1 is a block diagram of a communication system 1 that

is suitable for practicing this invention. In the

illustrated embodiment, the communication system 1 comprises

a plurality of user communication terminals 18a, 18b and

user information appliances 19a, 19b, hereinafter referred

20 to collectively as "user communication devices", and a

plurality of communication networks 32, 34 which are

bidirectionally coupled to another communication network

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entity, such as the Internet 17. Traditionally, various

types of interconnecting equipment may be employed for

connecting the networks 32, 34 and user information

appliances 19a, 19b (via respective interfaces 3a and 3b) to

5   the Internet 17, such as, for example, gateways, optical

fibers, wires, cables, switches, routers, modems (in the

case of user information appliances 19a, 19b), and other

types of communication equipment, as can be readily

appreciated by one skilled in the art, although, for

10   convenience, no such equipment is shown in Fig. 1. The

networks 32, 34 are typically provided and maintained by an

enterprise, such as a service provider SP1, SP2.

In the illustrated embodiment, the user communication

terminal 18a is a radiotelephone that includes an antenna

15   18a' for transmitting signals to and receiving signals from

a base site or base station 30 of the network 32, via an

interface 19. Preferably, the interface 19 is a wireless

interface, and the user communication terminal 18a is

capable of operating in accordance with any suitable

20   wireless communication protocol, such as IS-136, GSM, IS-95

(CDMA), wideband CDMA, narrow-band AMPS (NAMPS), and TACS.

Dual or higher mode phones (e.g., digital/analog or

10

TDMA/CDMA/analog phones) may also benefit from the teaching

of this invention, and so called "Voice-Over-IP" technology,

such as H.323 and SIP protocols, may also benefit as well.

It should thus be clear that the user communication terminal

5   18a can be capable of operating with one or more air

interface standards, communication protocols, modulation

types, and access types, and that the teaching of this

invention is not limited for use with any particular one of

those standards/protocols, etc.

10   The network 32 preferably is a cellular network that

includes the base station 30, a main switching office (MSO)

31 bidirectionally coupled between the base station 30 and

the Internet 17, a database 33, and a server 33'. The MSO 31

controls the exchange of information between the user

15   communication terminal 18a, the Internet 17, and other

communication devices which may be connected to the MSO 31,

such as Public Switched Telephone Network (PSTN) telephones

(not shown). This information may include, for example,

voice and data messages. The database 33 is bidirectionally

20   coupled to the Internet 17 through the server 33', and is

employed for storing various types of information, including

information representing user-selected call alerting

signals, as will be further described below.

The server 33' is a computer or farm of computers that

facilitate the transmission, storage, and reception of

information between different points, such as between the

5   database 33 and the Internet 17. From a hardware

standpoint, a server 33' typically includes one or more

components, such as one or more microprocessors (not shown),

for performing the arithmetic and/or logical operations

required for program execution, and disk storage media, such

10 as one or more disk drives (not shown) for program and data

storage, and a random access memory, for temporary data and

program instruction storage. From a software standpoint, a

server 33' typically includes server software resident on

the disk storage media, which, when executed, directs the

15 server 33' in performing data transmission and reception

functions. The server software runs on an operating system

stored on the disk storage media, such as UNIX or

Windows NT, and the operating system preferably adheres to

TCP/IP protocols. Also, in a preferred embodiment, the

20 server 33' is a Web or HTTP server, and the server software

enables the server 33' to exchange information with client

software (typically a browser) using the Hypertext Transfer

Protocol. As is well known in the art, server computers are

offered by a variety of hardware vendors, can run different

operating systems, and can contain different types of server

software, each type devoted to a different function, such as

5   handling and managing data from a particular source, or

transforming data from one format into another format. It

should thus be clear that the teaching of this invention is

not to be construed as being limited for use with any

particular type of server computer, and that any other

10   suitable type of device for facilitating the exchange and

storage of information may be employed instead.

The network 34 will now be described. The network 34

preferably comprises a server 7', a database 7 which is

bidirectionally coupled to the Internet 17 through the

15   server 7', and a central office switching station (COSS) 8

which is bidirectionally coupled to both the Internet 17 and

the user communication terminal 18b. An interface 9 couples

the user communication terminal 18b to the COSS 8, and may

include, for example, a telephone line (e.g., landline

20   trunk) of a PSTN (not shown), one or more coaxial cable

lines, a wireless interface, and/or modems (e.g., ADSL

modems) and the like, depending on applicable performance

criteria.   The COSS 8 controls the exchange of information

(voice and data messages) between the user communication

terminal 18b, the Internet 17, and other communication

devices which may be connected to the COSS 8, such as PSTN

5   telephones (not shown).

Like the database 33 of network 32, the database 7 of

network 34 stores information such as information

representing user-selected call alerting signals, as will be

described in greater detail below.   The server 7' preferably

10   is similar to the server 33' described above, and

facilitates the transmission, storage, and reception of such

information and other data, between points such as the

database 7 and Internet 17.

The information stored in the databases 7, 33 will now be

15   described in greater detail.   In accordance with an aspect

of this invention, each of the databases 7, 33 includes a

plurality of sets of data tables, each of which sets

corresponds to a particular user communication terminal 18a,

18b or information appliance 19a, 19b.   An example of a set

20   of data tables T1, T2 stored in an individual database 7, 33

is shown in Figs. 2b and 2c, respectively.   Data table Tl

(i.e., a look-up table) preferably has a plurality of

columns X and Y (Fig. 2b), each of which includes a

respective plurality of memory locations or cells X1-Xn, Y1-

Yn, for storing particular types of information. In a

preferred embodiment each memory location X1-Xn of column X

5   is employed for storing acoustic information, such as a

sampled and digitized version of one or more audible

signals. For example, memory location X1 may be employed

for storing acoustic information which a party P1, P2

desires to be transmitted in a call signal to be sent from a

10   device 18a, 18b, 19a, 19b to another, recipient device, for

subsequent use in that recipient device for generating a

corresponding audible signal indicating the receipt of the

call signal. Also by example, memory locations X2-Xn each

may be employed for storing acoustic information

15   representing a digitized and sampled version of one or more

audible signals which a party P1, P2 desires to be generated

in his receiving device 18a, 18b, 19a, 19b when an incoming

call signal is received from a particular calling source.

It should be noted that the terms "audible signal" and

20   "alerting signal" are hereinafter used interchangeably in

this description, and the terms "acoustic information" and

"audio sample(s)" also are used interchangeably in this

15

description.

The memory locations Y1-Yn of column Y are associated with

respective ones of the memory locations X1-Xn of column X,

and each include information (also referred to as

5   "communication device identifier information") which relates

to a particular user communication device 18a, 18b, 19a, 19b

and corresponds to the information included in the

corresponding memory location X1-Xn. For example, the

information included in each memory location Y1-Yn may

10   specify one or more access codes of one or more user

communication devices 18a, 18b, 19a, 19b, such as, for

example, a device's telephone number, pager number, IP

address, DNS domain name, and/or a public key certificate,

etc., depending on the types of devices employed and

15   applicable operating criteria.

Data table T2 (Fig. 2c) includes a plurality of memory

locations Z1-Zn that are employed for storing information

relating to particular communication devices 18a, 18b, 19a,

19b for which a receiving device will generate a call

20   alerting signal based on acoustic information received from

those devices. The manner in which information is stored in

the data tables T1, T2 of databases 7, 33, and the manner in

which that information is subsequently used in accordance

with this invention for indicating the receipt of incoming

calls in the devices 18a, 18b, 19a, 19b, will be described

below in greater detail.

5   The Internet 17 will now be described. As used herein, the

term "Internet" refers to an infrastructure having protocols

and operating rules which effectively permit the creation of

a world-wide "network of networks". By connecting a

communication device, such as the devices 18a, 18b, 19a,

10   19b, to the Internet 17, information may be exchanged

between those devices and any other source/destination

device which also is connected to the Internet 17. Thus, a

matrix of interconnected communication devices is provided

for enabling information to be exchanged between those

15   devices. In general, devices within the Internet, and

devices connected to the Internet, adhere to TCP/IP

protocols. Typically, gateways (not shown) and various

other components which may interconnect the Internet 17 to

external components, operate in accordance with TCP/IP

20   protocols to form IP packets based on information

(including, e.g., digitized acoustic signals) received from

the external components, before routing those packets

towards a particular destination, and also convert IP

packets received from Internet 17 components back to their

original form of information, before forwarding that

information towards a particular destination.   In general,

5   routers (not shown) or other suitable types of

switching/routing components are used for routing IP packets

throughout the Internet 17, based on IP address information

included in the information.

Referring now to Fig. 2a, a preferred embodiment of the

10   individual user communication terminals 18a, 18b is shown,

and is identified by reference numeral 10.   The user

communication terminal 10 includes an interface 23 for

communicatively coupling the terminal 10 to an external

communication interface, such as the interface 19 (Fig. 1),

15   in the case of user communication terminal 18a, or the

interface 9, in the case of user communication terminal 18b.

For example, the interface 23 of Fig. 2a may include a

transceiver and an antenna (in the case of terminal 18a) for

enabling the terminal 10 to exchange information with the

20   external interface.   That information may include signaling

information in accordance with the external interface

standard employed by the respective network 32, 34 coupled

to the terminal 10, user speech, and data.

A user interface of the terminal 10 includes a conventional

speaker 17b, a display 20, a user input device, typically a

keypad 22, and a transducer device, such as a microphone

5   21b, all of which are coupled to a controller 18 (CPU),

although in other embodiments, other suitable types of user

interfaces also may be employed. The keypad 22 includes the

conventional numeric (0-9) and related keys (#, *), and

other keys that are used for operating the user

10   communication terminal 10, such as a SEND key (terminal

18a), various menu scrolling and soft keys, etc. A digital-

to-analog (D/A) converter 17a is interposed between an

output of the speaker 17b and the controller 18. The D/A

converter 17a converts digital information signals received

15   from the controller 18 into corresponding analog signals,

and forwards those analog signals to the speaker 17b, for

causing the speaker 17b to output a corresponding audible

signal. An analog to digital (A/D) converter 21a is

interposed between an output of the microphone 21b and an

20   input of the controller 18, and operates by repetitively

sampling and then digitizing analog signals received from

the microphone 21b, and by providing acoustic information

representing the resulting digital values to the controller

18.   In one embodiment of the invention, a clock or timer

18-a is included in the controller 18.

The user communication terminal 10 also includes various

5   memories, such as a RAM 24a, a ROM 24b, and a Flash memory

24c, shown collectively as the memory 24.   In accordance

with one embodiment of this invention, the memory 24 also

includes a data table T1 as shown in Fig. 2a described

above, and a data table T2 as shown in Fig. 2b described

10   above, wherein the individual tables T1, T2 preferably are

included in the Flash memory 24c of the terminal 10.   As

will be described in more detail below, and in accordance

with an embodiment of this invention, the information

included in the data tables T1, T2 of memory 24 is

15   synchronized with information stored in corresponding data

table T1, T2 of a corresponding one of the databases 7 (in

the case of terminal 18b) and 33 (in the case of terminal

18a).

An operating program for controlling the operation of

20   controller 18 also is stored in the memory 24 (typically in

ROM 24b) of the user communication terminal 10, and may

include routines to present messages and message-related

20

functions to the user on the display 20, typically as

various menu items.   The operating program stored in memory

24 also includes routines for implementing a method that

enables the user to enter or otherwise manipulate

5   information in the data tables T1, T2 of the databases 7, 33

and user communication terminals 18a, 18b, in accordance

with a memory programming mode of this invention, and

routines for implementing a method that enables stored

acoustic information to be employed for generating audible

10   alerting signals indicating the receipt of incoming calls at

receiving devices.   Those methods will be described below in

relation to Figs. 3a-3c, 4a, 4b, and 5.   In accordance with

one embodiment of the invention, at least one program stored

in memory 24 adheres to TCP/IP protocols, for implementing a

15   known method for connecting the terminal 10 to the Internet

17.   The memory 24 preferably also stores software (e.g.,

web browser software) for enabling a user to navigate or

otherwise exchange information with the World Wide Web,

using interface 22.

20   Referring now to Fig. 2d, an exemplary embodiment of the

individual user information appliances 19a, 19b is shown,

and is identified by reference numeral 2.   The user

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information appliance 2 preferably comprises a controller

(e.g., a microprocessor and/or logic array) 2a for

performing arithmetic and/or logical operations required for

program execution, an input user-interface 2d coupled to the

5   controller 2a, an output user-interface 2e coupled to the

controller 2a, and, according to one embodiment, a

microphone 2f coupled to an input of the controller 2a

through an A/D converter 2g, and a speaker 2i coupled to an

output of the controller 2a through a D/A converter 2h. An

10   interface 2b couples the controller 2a bidirectionally to an

external interface, such as the interface 3a, in the case of

user information appliance 19a, or the interface 3b, in the

case of user information appliance 19b, and is used by the

controller 2a to communicate bidirectionally with that

15   external interface.

The input user-interface 2d may include any suitable type of

user-operable input device(s), such as, for example, a

keyboard, mouse, touch screen, or trackball, and the output

user-interface 2e may include, for example, a video display,

20   a liquid crystal or other flat panel display, a printer,

and/or any other suitable type of output device for enabling

a user to perceive outputted information. For the purposes

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of this description, the output user-interface 2e is assumed

to be a display.

The user information appliance 2 of Fig. 2d also includes at

least one memory (e.g., disk drives, read-only memories,

5   and/or random access memories) 2c that is bidirectionally

coupled to the controller 2a. The memory 2c stores

temporary data and instructions, and also stores various

routines and operating programs (e.g., Microsoft Windows,

UNIX/LINUX, or OS/2) that are used by the controller 2a for

10   controlling the overall operation of the user information

appliance 2. Preferably, at least one of those programs

(e.g., Microsoft Winsock) stored in memory 2c adheres to

TCP/IP protocols (i.e., includes a TCP/IP stack), for

implementing a known method for connecting the appliance 2

15   to the Internet 17, through the respective external

interface 3a or 3b of the system 1. The memory 2c

preferably also stores web browser software, such as, for

example, Microsoft Internet Explorer (IE) and/or Netscape

Navigator, for enabling a user of the appliance 2 to

20   navigate or otherwise exchange information with the World

Wide Web (WWW), using user interface 2d. In accordance with

one embodiment of the invention, the memory 2c may also

stores software, such as, for example, Microsoft NetMeeting,

that implements protocols (e.g., H.323, SIP, and/or RTP) for

enabling the appliance 2 to send and receive phone calls

through the Internet 17, while connected thereto. The

5   memory 2c also may store data tables T1, T2 having

information as shown in Figs. 2b and 2c, respectively, for

use in accordance with this invention to indicate the

receipt of call signals sent to, or received by, the

information appliance 2. Routines for implementing methods

10   according to this invention also are stored in the memory

2c. Those methods will be described below in relation to

Figs. 3a-3c, 4a, 4b, and 5.

Before describing the various methods of the invention, it

should be noted that the total number and variety of user

15   communication terminals and user information appliances

which may be included in the overall communication system 1

can vary widely, depending on user support requirements,

geographic locations, applicable design/system operating

criteria, etc., and are not limited to those depicted in

20   Fig. 1. Also, this invention may be employed in conjunction

with any suitable types of communication protocols,

including, but not limited to, for example, Internet

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telephony protocols, ATM telephony protocols, GSM cellular

telephony protocols, and ANSI ISUP. Moreover, although in

Fig. 1 the user communication terminals 18a, 18b are

depicted as a radiotelephone and a conventional, non-

5   wireless telephone, respectively, and the user information

appliances 19a, 19b are depicted as PCs, any other suitable

types of user communication terminals and/or information

appliances may be employed, in addition to, or in lieu of,

those components. For example, in other embodiments, and

10   where appropriate, one or more of the individual devices

18a, 18b, 19a, 19b may be embodied as a personal digital

assistant, a handheld personal digital assistant, a palmtop

computer, a pager, and the like. It also should be noted

that, although the invention is described in the context of

15   the various devices 18a, 18b, 19a, 19b communicating with

other components through the Internet 17 and networks 32,

34, broadly construed, the invention is not so limited. For

example, one or more of the user communication devices 18a,

18b, 19a, 19b may communicate with one another through other

20   suitable interfaces, and/or may be included within a same

network. In general, the teaching of this invention may be

employed in conjunction with any suitable types of

communication devices that are capable of communicating with

another communication device, and which include a user

interface for enabling a user to input information and

perceive outputted information. It should thus be clear that

the teaching of this invention is not to be construed as

5   being limited for use with any particular type of user

communication terminal, user information appliance, or

communication protocol.

It also should be noted that although the invention is

described in the context of the servers 7' and 33' being

10   included in the networks 34 and 32, respectively, the

invention is not necessarily limited to that configuration.

For example, in other embodiments those devices 7' and 33'

may be connected within other suitable locations of the

communication system 1, such as within the Internet 17. In

15   other embodiments, no servers 7', 33' need be employed at

all in cases where other suitable components are employed

for facilitating the transfer and storage of information to

and from the databases 7, 33.

Having described the various components of the communication

20   system 1, an aspect of this invention will now be described,

with reference to the flow diagram of Figs. 3a and 3b. In

accordance with this aspect of the invention, a party P1, P2

26

can select one or more audible alerting signals (e.g.,

sounds) which he desires to be used for indicating the

receipt of an incoming call at a particular communication

device 18a, 18b, 19a, 19b. Acoustic information

5   representing a digital version of those audible signals

preferably can be stored by the party P1, P2 in one or more

desired devices 18a, 19a, 33, 18b, 19b, 7, along with

corresponding communication device identifier information,

using various techniques of this invention.

10   In step 100 of Fig. 3a, the method is started, and it is

.assumed that the user information appliance 19a is

"connected" to the Internet 17 through the interface 3a. For

example, the user information appliance 19a may connect to

the Internet 17 in response to party P1 causing a

15   predetermined icon presented on display 2e of the appliance

19a to be selected, in which case one of the above-described

programs stored in memory 2c of the appliance 19a responds

by communicating through the interface 3a to connect the

appliance 19a with the Internet 17, in accordance with

20   TCP/IP protocols.

In step 102, it is assumed that the party P1 desires to

store information in at least one of the data tables T1, T2

27

(from database 33) corresponding to user communication

terminal 18a, and thus operates the user interface 2d to

cause a predetermined view (not shown) to be presented on

the display 2e. Preferably, that predetermined view is a

5   web page retrieved from the database 33. For example, step

102 may be performed by the party P1 operating the interface

2d to cause predetermined software (e.g., web browser

software) stored in the memory 2c to communicate through the

interface 3a and Internet 17 with the server 33', and to

10   cause that server 33' to retrieve the predetermined web page

from the database 33, although in other embodiments, other

suitable techniques for accessing desired information from

the database 33 may also be employed. Also, in one

embodiment the predetermined web page may be dedicated

15   specifically to the user communication terminal 18a by the

service provider SP1, and may require the party P1 to enter

a predetermined password (e.g., a telephone number of

terminal 18a), before granting that party P1 access to the

data tables T1, T2 of database 33, using a known technique.

20   Preferably, the predetermined view presented to the party P1

in step 102 prompts the party P1 to specify whether or not

he desires to obtain access to one of the data tables T1, T2

28

(from database 33) corresponding to user communication

terminal 18a, for entering or otherwise manipulating

information stored in that table. For the purposes of this

description, it is assumed that the party P1 desires to

5   store communication device identifier information in table

T2 of database 33, to identify communication device(s) for

which he authorizes the terminal 18a to generate audible

alerting signals based on acoustic information received from

those devices. Accordingly, the party P1 responds to the

10   prompt by entering information into user interface 2d

specifying that he desires to obtain access to data table T2

("Y" in step 104). As a result, control then passes to step

106 where the data table T2 is accessed from the database

33, and a view of the table T2 is presented to the party P1

15   via the display 2e of the user information appliance 19a.

Thereafter, in step 108 it is assumed that the party P1

enters information, such as, e.g., a telephone number of

user communication terminal 18b, through the user interface

2d of user information appliance 19a (although, as

20   previously described, other information may also be entered,

such as an IP address, DNS domain name, a public key

certificate, etc., corresponding to a desired user

29

communication device). In response to the information being

entered in step 108, software employed by the controller 2a

communicates the entered information to the server 33',

which then stores the information in a predetermined memory

5   location, such as memory location Z1, of table T2 in the

database 33 (step 110).

Thereafter, in step 112, a message is presented to the party

P1 via display 2e, prompting the party P1 to specify whether

or not he desires to store or otherwise manipulate further

10   information in the table T2 of database 33. If the party P1

responds by entering information into the user interface 2d

specifying that he does not desire to do so ("N" in step

112), then control passes back to step 104 where the method

proceeds in the above-described manner. Otherwise, if the

15   party P1 specifies that he does desire to store or otherwise

manipulate further information in the data table T2 ("Y" in

step 112), then control passes back to step 106 where the

method then continues in the above-described manner.

Referring again to step 104, it now is assumed that the

20   party P1 desires to store (in data table T1 of database 33)

acoustic information which he desires to be employed by the

user communication terminal 18a to generate audible

30

signal(s) for indicating the receipt of incoming calls from

a particular source communication device, and thus enters

information into the user interface 2d specifying that he

desires access to the data table T1 ("N" in step 104). As a

5   result, control passes to step 114 where a message is

presented on the display 2e prompting the party P1 to enter

predetermined information (e.g., a telephone number) into

the appliance 19a for identifying the source communication

device. Assuming that the party P1 then enters information,

10   such as a telephone number of user communication terminal

18b, into the interface 2d of the appliance 19a (step 116),

then the entered information is communicated to the database

33 and stored in a predetermined memory location, such as

memory location X1 of data table T1 (step 118).

15   Thereafter, control passes to step 120 where a message is

presented on the display 2e prompting the party P1 to input

one or more sounds which he desires to be used by user

communication terminal 18a to indicate the receipt of

incoming calls sent from the source device identified by the

20   information entered in step 116. Thereafter, it is assumed

that the party P1 then responds by entering a desired

audible signal (sound wave) 2f' (Fig. 2d) into the

information entered in step 116. Thereafter, it is assumed

that the party P1 then responds by entering a desired

audible signal (sound wave) 2f' (Fig. 2d) into the

information appliance 19a (step 122). For example, the

5   party P1 may enter the signal 2f' by speaking into the

microphone 2f, or by causing acoustic waves generated by an

external source to be entered into the microphone 2f. In

either case the entered signal is repetitively sampled and

converted to digital form by the A/D converter 2g, and

10   resulting digital acoustic information representing a

digital version of the entered signal is provided to the

controller 2a. As another example, the party P1 may connect

an external audio source to an interface (e.g., a port) of

the appliance 19a, and then cause acoustic information to be

15   downloaded from that source directly into the controller 2a

of the appliance 19a. As a further example, instead of

inputting an externally-derived acoustic wave in the above-

described manner, the party P1 may desire to employ an

acoustic sample already stored in the memory 2c of the

20   appliance 19a. For example, that acoustic sample may have

been downloaded to the appliance's memory 2c from a

particular web site accessed by the party P1, while

previously navigating the world-wide-web (in a known

32

responds by retrieving that sample (acoustic information)

from the memory 2c.

In response to step 122 being performed, the controller 2a

of the information appliance 19a communicates the acoustic

5   information obtained in step 120, to the server 33', which

in turn, causes the acoustic information to be stored in,

for example, memory location Y1 in the table T1 of database

33 (step 124).

Thereafter, control passes through connector (A1) to step

10   126 of Fig. 3b, where a message is presented on the display

2e of information appliance 19a prompting the party P1 to

specify whether or not he desires to store further acoustic

information in the data table T1 of database 33. If the

party P1 then responds by entering information into the

15   information appliance 19a specifying that he does desire to

store further acoustic information in the data table T2 ("Y"

in step 126), then control passes back to step 114 of Fig.

3a, where the method then proceeds in the above-described

manner. If the party P1 specifies otherwise ("N" in step

20   126), then, according to one embodiment of the invention,

control passes to step 128 where another message is

presented on the display 2e, this time prompting the party

P1 to specify whether or not he desires to have the

information from the data tables T1 and T2 of database 33

copied to the corresponding data tables T1 and T2 of the

memory 24 of user communication terminal 18a (i.e., for

5   synchronized the tables T1, T2 of those devices 33 and 18a

together). Assuming that the party P1 then enters

information into the information appliance 19a instructing

that the tables T1, T2 in the devices 18a and 33 be

synchronized, and also assuming that the communication

10   terminal 18a is connected to the Internet 17 (by way of

interface 19 and components 30 and 31), then the controller

2a of user information appliance 19a communicates in the

above-described manner with the server 33' to cause the

information from the data tables T1, T2 of database 33 to be

15   copied, downloaded to the user communication terminal 18a

(via intermediate components 17, 31, 30, and 19), and stored

in the corresponding data tables T1, T2 within the memory 24

of the user communication terminal 18a (step 130). For

example, the copied information may be forwarded by the

20   components 33, 17, and 31 to the terminal 18a, based on

information defining the telephone number of that terminal

18a, entered into the appliance 19a by party P1 when

instructing that the synchronization process be performed in

34

step 130. In the foregoing manner, the information included

in the data tables T1, T2 of the memory 24 is synchronized

with (i.e., replicated) that from the corresponding tables

T1, T2 from database 33. Thereafter, control passes to step

5   132 where the method is terminated.

It should be noted that in other embodiments of the

invention, other suitable techniques also may be employed

for synchronizing the communication terminal memory 24 with

the database 33, either in lieu of, or in addition to, that

10   described above. For example, in accordance in another

embodiment of this invention, the controller 2a of user

information appliance 19a periodically (i.e., at

predetermined time intervals, determined by clock 2-a)

communicates with the server 33' in the above-described

15   manner to cause the information to be copied from the

database 33 tables T1, T2 to the memory 24 of user

communication terminal 18a, while the information appliance

19a and terminal 18a are both connected to the Internet 17.

In another embodiment of the invention, the controller 18 of

20   the user communication terminal 18a periodically (i.e., at

predetermined time intervals determined by clock 18-a)

communicates with the server 33' (through the intermediate

components 19, 30, 31, and 17) while registered with the

network 32 and connected to the Internet 17, to cause the

information to be copied from the database 33 tables T1, T2

to the terminal memory 24 in the above-described manner.

5   In still another embodiment of the invention, the

synchronization process is performed in response to a party,

such as party P1, entering a command into the user

communication terminal 18a, specifying that the

synchronization process be performed. As an example of this

10   embodiment, and referring to Fig. 3c, it is assumed that,

while the user communication terminal 18a is both registered

with the network 32 and connected to the Internet 17 (step

136), the party P1 operates the keypad 22 of the terminal

18a to cause a predetermined menu to be presented on the

15   display 20 (step 140). Preferably, the predetermined menu

prompts the party P1 to specify whether he wishes to

initiate the synchronization procedure. For example, that

menu may include a message reading "Would you like to

download sound samples?". Assuming that the party P1 then

20   responds by entering information into the keypad 22

specifying "Yes" (step 142), then the controller 18 of

terminal 18a responds by communicating, to the server 33',

information requesting a download of the information from

the tables T1, T2 of database 33, by way of the intermediate

components 19, 30, 31, and 17 (step 144). The server 33'

then responds to receiving that request by causing the

5   information to be copied from the data tables T1, T2 of

database 33 to the corresponding data tables T1, T2 within

the terminal memory 24, in the above-described manner (step

146).

As another example, the menu presented on the terminal

10   display 20 in step 140 may include a message reading "Would

you like to listen to pre-set sound samples?" In this case,

assuming that the party P1 then responds by entering

information into the keypad 22 specifying "Yes" in step 142,

then the controller 18 of terminal 18a responds by

15   communicating with the database 33 through the server 33',

in accordance with, for example, web browser software stored

in memory 24, to cause a predetermined view to be presented

on the display 20 of terminal 18a. Preferably, that

predetermined view is a web page retrieved from database 33,

20   presenting various filenames corresponding to pre-stored

audio samples in the database 33. That predetermined view

preferably also presents the party P1 with an option

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(preferably as a list of filenames) to select (through

interface 22) one or more audio samples which he desires to

listen to. Assuming that the party P1 selects a particular

displayed filename, then the corresponding sound sample is

5   retrieved from database 33 (step 144) and downloaded to the

terminal 18a (step 146), wherein it is converted to an

analog signal by the D/A converter 17a and then outputted in

audible form by the speaker 17b. The predetermined view

presented in step 140 preferably also prompts the party P1

10   to select one or more of the audio samples which he desires

to be downloaded and stored in the memory 24 of terminal

18a. For example, the view may include a message such as

"Please select desired sound samples". Assuming that in

step 142 the party P1 interacts with the presented view

15   through the user interface 2d to respond to that message by

selecting one or more filenames corresponding to audio

samples which he desires to be downloaded, then in step 144

the controller 18 communicates with the database 33 through

server 33', in the above-described manner, to cause the

20   corresponding audio sample(s) to be retrieved from the table

T1 of database 33 and downloaded to the terminal 18a (step

146), wherein those sample are then stored in predetermined

memory locations X1-Xn of table T1 within memory 24.

For either of the foregoing examples, and in cases in which

the party P1 operates the terminal 18a in step 142 to

initiate the synchronization procedure while the user

5   communication terminal 18a is not connected to the Internet

17, as recognized by the controller 18 based on

predetermined information (e.g., either Internet-level

information, such as PPP status information or the presence

or absence of IP address information, or lower level status

10 information, such as modem status information) then the

controller 18 responds by operating in accordance with a

program stored in memory 24 to connect the terminal 18b to

the Internet 17 (through components 19, 30, and 31), in

accordance with, for example, TCP/IP protocols. Thereafter,

15 in response to recognizing that the user communication

terminal 18a is connected to the Internet 17, the controller

18 communicates with the server 33' in step 144 as described

above to cause the information from data tables T1, T2 in

database 33 to be automatically copied to the corresponding

20 data tables T1, T2 in the terminal memory 24 in step 146.

In accordance with another embodiment of this invention,

acoustic information and communication device identifier

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information may be provided in the data tables T1, T2 of the

individual databases 7, 33 by the corresponding service

providers SP1, SP2, and the service provider SP1, SP2 may or

may not permit the communication devices 18a, 18b, 19a, 19b

5   to have access to that information. For example, the

service provider SP1 (perhaps at the request of party P1)

may pre-assign predetermined audio samples to predetermined

user communication devices 18a, 18b, 19a, 19b, and then

store those audio samples in respective ones of the memory

10   locations X1-Xn of table T1 in database 33, along with

communication device identifier information identifying

those devices in corresponding memory locations Y1-Yn of

table T1. The service provider SP1 also may provide the

information within data table T2 of the database 33. In

15   addition, the service provider SP1 may elect to periodically

change the information (e.g., the audio samples) included in

any of the memory locations of one or both of the data

tables T1, T2 in database 33. For either case, any of the

above-described techniques for synchronizing the data tables

20   T1, T2 of memory 24 of communication terminal 18a with those

of the database 33 may be employed, after the information is

provided in the database 33 by the service provider SP1,

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It should be noted that any party, such the user of terminal

18a, or other users (e.g., such as acquaintances of the user

of terminal 18a), may initiate the above-described

5   techniques for causing acoustic information to be stored in

the terminal 18a, depending on applicable performance

criteria, and those storage procedures may be initiated from

any one of the devices 18a, 19a, 19b, or 18b. In cases

where a user of a device 19a, 18b, or 19b initiates one of

10 those procedures (for causing the acoustic information to be

stored in terminal 18a), any suitable type of authorization

procedures also may be employed (e.g., such as requiring the

party to specify a password for the terminal 18a and/or

database 33) before permitting a party to access to the

15 device 18a and/or 33.

It also should be noted that while the invention has been

described above in the context of the acoustic information

and communication device identifier information being

downloaded to the communication terminal 18a from the

20 network 32, other suitable techniques also may be employed

for storing the information in the user communication

terminal 18a. For example, where appropriate, sound waves

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representing desired sounds may be applied to the microphone

21b of the terminal 18a, in which case analog signals

outputted by the microphone 21b are sampled and converted to

digital form by the A/D converter 21a, and then stored in

5   the memory 24 as acoustic information by the controller 18.

As another example, acoustic information may be downloaded

from an external source coupled to an interface (e.g., a

port) of the terminal 18a, in which case the controller 18

responds by storing that information in the memory 24 of

10   terminal 18a. These entry procedures, as well as procedures

for entering corresponding communication device identifier

information, may be performed by the party P1 while, for

example, scrolling through and interacting with various

menus and prompts presented on display 20, wherein those

15   prompts are preferably similar to those described above with

respect to steps 102, 112, 114, and 120. Also by example,

the acoustic information sample may be downloaded to the

terminal 18a from a particular web site, in a similar manner

as described above. The steps which are performed by the

20   terminal 18a for storing entered information preferably are

similar to those described above with regard to the

information appliance 19a, as modified for the terminal 18a

in a manner as would be readily appreciated by one skilled

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in the art in view of this description.

Having described the various techniques of the invention for

storing acoustic and communication device identifier

information in the databases 7, 33 and user communication

5   devices 18a, 18b, 19a, 19b, another aspect of this invention

will now be described. In accordance with this aspect of

the invention, stored acoustic information is employed for

generating audible signals indicating the receipt of

incoming calls signal at recipient communication devices

10   18a, 18b, 19a, 19b. A method in accordance with this aspect

of the invention will now be described, with reference to

Figs. 4a and 4b.

In step 200 of Fig. 4a the method is started, and it is

assumed that a party, such as party P2, operates one of the

15   user communication devices, such as terminal 18b, to cause

the terminal 18b to enter a telephone call origination mode

in which a predetermined menu is presented on the display 20

(step 202). The predetermined menu preferably prompts the

party P2 to specify whether or not he desires to place a

20   telephone call to another, recipient communication device,

and if so, whether or not he desires that the recipient

device indicate the receipt of the call signal by sounding

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an audible alerting signal selected by the party P2. By

example, the user communication terminal 18b may prompt the

party P2 in step 202 by presenting a message on the display

20 reading "send call with customized ringing?".

5   Assuming that party P2 then operates the keypad 22 of

terminal 18b to enter information into the controller 18

specifying that the call be placed without implementing

customized ringing ("N" in step 204), then control passes to

step 206 where the terminal 18b presents a message on the

10 display 20 of that terminal 18b prompting the party P2 to

specify an access code (e.g., a telephone number) of a

communication device to which he desires to place a call.

Assuming that the party P2 then operates the keypad 22 to

enter information into the terminal 18b specifying a

15 telephone number of a desired recipient communication

device, such as user communication terminal 18a, and also

enters information into the terminal 18b (e.g., by

depressing a "SEND" key) specifying that a call be placed to

that recipient communication terminal 18a (step 208), then

20 the controller 18 responds by causing a call signal to be

transmitted to the terminal 18a, by way of the network

interface 23 of terminal 18b and the components 9, 8, 17,

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31, 30, and 19 of the communication system 1 (step 210), in

a conventional manner. Preferably, the call signal includes

both the telephone number information entered in previous

step 208 and information (e.g., telephone number)

5   identifying the calling terminal 18b. Thereafter, control

passes through connector (A1') to step 232 of Fig. 4b, where

the method then continues in a manner as will be described

below.

Referring again to step 204, assuming that the party P2

10   operates the keypad 22 to enter information into the

controller 18 specifying that the customized ringing option

be implemented ("Y" in step 204), then control passes to

step 212 where the terminal 18b presents a message on the

display 20 of that terminal 18b prompting the party P2 to

15   specify whether he desires to enter one or more desired

sounds into the terminal 18b, for being included in digital

form in a call signal to be transmitted to a desired

recipient device, or whether he desires that pre-stored

acoustic information be included in that call signal.

20   If the party P2 then enters information (through the keypad

22) specifying that pre-stored acoustic information be

included in the call signal ("N" in step 214), then control

passes to step 216 where the terminal 18b presents a message

on the display 20 prompting the party P2 to specify the

telephone number of a recipient communication device to

which he desires to place a call. Assuming that the party

5   P2 then operates the keypad 22 to enter information into the

terminal 18b specifying the telephone number of user

communication terminal 18a, and also enters information into

the terminal 18b (e.g., by depressing the "SEND" key)

specifying that a call be placed to that terminal 18a (step

10   218), then, in accordance with one embodiment of the

invention, the controller 18 responds by referring to a

memory location Y1-Yn (in data table T1 of the memory 24)

that includes information (e.g., a telephone number)

identifying the terminal 18b, correlating that memory

15   location to a corresponding memory location X1-X1 in the

table T1 of memory 24, and by retrieving the acoustic

information stored in that memory location X1-Xn. The

controller 18 then forms a call signal that includes that

retrieved acoustic information and the telephone numbers of

20   terminals 18a and 18b within predetermined information

fields of the signal, and by causing the formed call signal

to be transmitted to the terminal 18a, by way of the

interface 23 (Fig. 2a) and the components 9, 8, 17, 31, 30,

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and 19 of the communication system 1 (step 220).

After the call signal is transmitted from the terminal 18b

in step 220, control passes through connector (A1') to step

232 of Fig. 4b, where the method continues in a manner as

5   will be described below.

According to another embodiment of this invention, step 220

is performed in the following manner. In response to the

party P2 specifying in step 218 that a call be placed to the

recipient terminal 18a, the controller 18 operates by 1)

10   forming a call signal that includes the telephone numbers of

the respective terminals 18a, 18b and request information

requesting the retrieval of acoustic information from the

database 7, and 2) by causing the formed call signal to be

forwarded towards the terminal 18a by way of the system

15   components 9, 8, and 17. Thereafter, the call signal is

routed by the Internet 17 to the server 7', based on the

request information included in the signal, and the server

7' then responds to the received signal by 1) correlating

the telephone number of terminal 18b from the call signal to

20   corresponding information in a memory location Y1-Yn of data

table T1 within database 7, 2) correlating that memory

location Y1-Yn to a corresponding memory location X1-X1 in

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the data table T1 of database 7, and 3) retrieving the

acoustic information stored in that location X1-Xn. The

server 7' then inserts the retrieved acoustic information

into another predetermined field of the call signal, and,

5   based on the telephone number of terminal 18a included in

the signal, forwards the signal to the terminal 18a by way

of the system components 17, 31, 30, and 19. Control then

passes through connector (A1') to step 232 of Fig. 4b, where

the method then continues in a manner as will be described

10   below.

In still another embodiment of this invention, step 220 may

be performed by retrieving acoustic information from the

database 33. For example, in this embodiment, the

controller 18 responds to the party P2 specifying (in step

15   218) that a call be placed to recipient terminal 18a by 1)

forming a call signal that includes the telephone numbers of

the respective terminals 18a, 18b and request information

requesting the retrieval of acoustic information from the

database 33, and 2) causing the formed call signal to be

20   forwarded towards the terminal 18a by way of the system

components 9, 8, and 17. Thereafter, the call signal is

routed by the Internet 17 to the MSO 31, which, based on the

request information included in the signal, communicates

with the server 33' to cause the server 33' to 1) correlate

the telephone number of terminal 18b from the call signal to

corresponding information in a memory location Y1-Yn of data

5   table T1 of database 33, 2) correlate that memory location

to a corresponding memory location X1-X1 in table T1 of

database 33, 3) retrieve the acoustic information from that

location X1-Xn, and 4) provide the retrieved information

back to the MSO 31. The MSO 31 then inserts the retrieved

10   acoustic information into another predetermined field of the

call signal, and, based on the telephone number of terminal

18a included in the signal, forwards the signal to the

terminal 18a by way of the system components 17, 31, 30, and

19. Control then passes through connector (A1') to step 232

15   of Fig. 4b, where the method then continues in a manner as

will be described below.

Referring again to step 214, a case in which the party P2

wishes to enter one or more desired sounds into the terminal

18b before placing a call will now be described. If, in

20   response to the prompt in step 212, the party P2 enters

information into the controller 18 (through keypad 22)

specifying that he wishes to enter one or more desired

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sounds into the terminal 18b, for being included in digital

form in a call signal to be transmitted to recipient

terminal 18a ("Y" in step 214), then control passes to step

222 where the terminal 18b presents another message on the

5   display 20 prompting the party P2 to enter the sound(s) into

the terminal 18b. Thereafter, the party P2 may enter the

desired sounds or digital acoustic information into the

terminal 18b, using any of the techniques described above.

For the purposes of this description only, it is assumed

10   that the party P2 responds to the message by applying an

audible signal 21b' to the microphone 21b of terminal 18b.

In this case the microphone 21b then outputs a corresponding

analog signal, which is then converted to digital acoustic

information by the A/D converter 21a. That acoustic

15   information then is provided to the controller 18, which, in

turn, stores the acoustic information in a predetermined

memory location, such as location X1, within the table T1 of

memory 24 (step 224).

After the step 224 is performed, control passes to block 226

20   where the terminal 18b presents another message on the

display 20 prompting the party P2 to specify a telephone

number of a communication device to which he desires to

place a call. Assuming that the party then operates the

keypad 22 to enter information into the terminal 18b

specifying the telephone number of terminal 18a, and also

enters information into the terminal 18b (e.g., by

5   depressing the "SEND" key) specifying that a call be placed

to that terminal 18b (step 228), then the controller 18

responds by retrieving the acoustic information stored

earlier in the memory 24 in previous step 224, forming a

call signal that includes that acoustic information within a

10   predetermined information field of the signal, and by

causing the formed call signal to be transmitted to the

terminal 18a, by way of the components 9, 8, 17, 31, 30, and

19 of the communication system 1 (step 230). After the call

signal is transmitted from the terminal 18b in step 230,

15   control passes to through connector (A1') to step 232 of

Fig. 4b, where the method then continues therefrom.

Referring now to Fig. 4b, the step 232 will now be

described. In step 232, it is assumed that the user

communication terminal 18a receives the call signal

20   originally transmitted by the terminal 18b during the

performance of either one of earlier steps 210, 220, or 230.

Within the terminal 18a, the received call signal is

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Within the terminal 18a, the received call signal is

provided from the interface 23 to the controller 18. In

accordance with one embodiment of the invention, the

controller 18 then responds to receiving the call signal by

5   examining the contents of the received signal to determine

whether or not a predetermined information field of the

signal includes acoustic information therein (i.e., acoustic

information originally sent in one of earlier steps 220 or

230) (step 234). If the controller 18 determines that the

10   predetermined information field of the received call signal

does not include acoustic information ("N" in step 236),

then control passes to step 238 where, in accordance with

one embodiment of the invention, the controller 18 extracts

information identifying the calling terminal 18b (e.g.,

15   terminal 18b's telephone number) from the received signal,

and compares that extracted information to information

stored in the memory locations Y1-Yn of table T1 in the

memory 24 of terminal 18a, to determine whether or not the

extracted information matches the information from any of

20   those memory locations Y1-Yn.

If the extracted information does not match the information

stored in any of those memory locations Y1-Yn ("N" in step

18 sets a flag to enable generation of a standard audible

tone indicating the receipt of the incoming call, in a

conventional manner. For example, the controller 18 may

cause the audible tone to be generated by programming the

5   D/A converter 17a to cause the D/A converter 17a to output a

signal which causes the speaker 17b to generate the audible

tone. The generation of the audible tone is analogous to

the ringing of a conventional telephone when an incoming

call is being received. Thereafter, control passes to step

10   246, where it is assumed that, at some time later, a user of

the terminal 18a answers the incoming call by depressing one

or more predetermined keys of the keypad 22 of the terminal

18a, or the incoming call signal is terminated by the

calling party P2 in a known manner.

15   If the information extracted by the controller 18 from the

received call signal in step 238 does match the information

stored in one of the memory locations Y1-Yn from data table

T1 of terminal 18a ("Y" in step 238), such as, for example,

memory location Y1, then the controller 18 correlates that

20   memory location Y1 to the corresponding memory location X1

from column X of table T1, and copies the acoustic

information from that memory location X1 (step 241).

Thereafter, the controller 18 provides the copy of the

acoustic information to the D/A converter 17a, which then

responds by outputting a corresponding analog signal to the

speaker 17, which, in turn, generates a corresponding

5   audible signal indicating the receipt of the incoming call

(step 242). In this manner, the acoustic information from

the memory location X1 of the terminal 18a is used by the

terminal 18a to generate a customized audio signal for

notifying party P1 of the receipt of the call from terminal

10   18b.

Preferably, in step 242 the controller 18 provides a copy of

the acoustic information to the D/A converter 17a at

predetermined time intervals (e.g., every two seconds or

so), determined by the timer 18-a, until controller 18 of

15   terminal 18a recognizes in a known manner either that the

call has been answered at the terminal 18a (by, e.g., party

P1) or the call has been terminated from terminal 18b (by,

e.g., party P2). In this manner, the audible signal is

generated by the terminal 18a at the predetermined time

20   intervals. In other embodiments, the acoustic information

may be output from the controller 18 continuously or a

predetermined, limited number (e.g., one or more) times, for

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predetermined, limited number (e.g., one or more) times, for

causing the audible signal to be generated accordingly,

until the call is answered or terminated in step 246.   In

accordance with one embodiment of the invention, the

5   controller 18 also deletes the acoustic information from the

memory location X1 which was correlated to previously in

step 241, in response to recognizing, in a known manner,

that the call has been answered or terminated in step 246.

Referring again to step 236, a case in which the controller

10   18 of terminal 18a determines that a predetermined

information field of the received call signal does include

acoustic information in step 236 ("Y" in step 236) will now

be described.   If the controller 18 determines in step 236

that the received call signal does include acoustic

15   information in the predetermined information field thereof

("Y" in step 236), then control passes to step 248 where the

controller 18 extracts information identifying the calling

terminal 18b (e.g., the terminal 18b's telephone number)

from another predetermined information field included in the

20   received signal, and compares that extracted information to

the information stored in the individual memory locations

Z1-Zn from data table T2 of memory 24, to determine whether

from any of those memory locations Z1-Zn (i.e., to determine

whether or not the terminal 18a has been pre-authorized to

output an audible signal based on the acoustic information

included in the call signal received from calling terminal

5   18b) (step 250).

If the extracted information does not match the information

stored in any of the memory locations Z1-Zn ("N" in step

250), then control passes to step 240 where the controller

18 sets a flag to cause a conventional alerting tone to be

10   generated in the above-described manner, and the method then

continues as described above.

If the acoustic information extracted by the controller 18

from the received call signal in step 248 does match the

information stored in any one of the memory locations Z1-Zn

15   from data table T2 ("Y" in step 250), then the controller 18

stores the extracted information in the memory 24 of the

terminal 18a, preferably in the RAM 24a or Flash memory 24c

(step 252). The controller 18 also provides a copy of that

acoustic information to the D/A converter 17a to cause the

20   D/A converter 17a to output a corresponding analog signal to

the speaker 17, which, in turn, generates a corresponding

audible signal indicating the receipt of the incoming call

(step 254). In this manner, the acoustic information

originally included in the call signal transmitted from the

calling terminal 18b in earlier step 220 or 230, is employed

at the receiving terminal 18a to generate a corresponding

5   audible signal indicating the receipt of the call signal

from calling terminal 18b.

Preferably, step 254 is performed so that the audible signal

is generated by the terminal 18a at predetermined time

intervals (e.g., every two seconds or so) (i.e., the

10   controller 18 outputs the acoustic information to D/A

converter 17a at predetermined time intervals), as

determined by the clock 18-a, until the controller 18

recognizes in a known manner either that the call has been

answered by the party P1 or terminated (by, e.g., party P2)

15   (step 246). In other embodiments, the audible signal may be

generated either continuously or a predetermined, limited

number (e.g., one or more) times, in the above-described

manner, until the call is either answered or terminated in

step 246. In accordance with one embodiment of the

20   invention, the controller 18 also deletes the acoustic

information from the memory 24 in response to recognizing

that the call signal is answered or terminated in step 246.

Thereafter, control passes to step 256 where the method is
terminated.

It should be noted that although the invention is described

above (e.g., steps 238 and 241) in the context of the

5   terminal 18a selecting pre-stored acoustic information based

on communication identifier information (e.g., telephone

number) included in a received call signal, in other

embodiments of the invention, the selection of pre-stored

acoustic information may be performed based on other

10   predetermined criteria. For example, in accordance with

another embodiment of the invention, the selection may be

based on the time and/or day at which the call signal is

received by the terminal 18a. In that embodiment, the

information stored in the individual memory locations Y1-Yn

15   may specify dates, time periods within a day, etc.,

depending on applicable operating criteria. When a call

signal is received by the terminal 18a in step 232 of Fig.

4b, the controller 18 of that terminal 18a responds to

receiving a predetermined information field (e.g., a

20   beginning field) of that signal by referring to the clock

18-a to determine the time and/or date at which the call

signal is received. Thereafter, and assuming that control

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passes through step 236 to step 238 in the above-described

manner, then step 238 is performed by comparing the

determined time and/or date to the information from the

memory locations Y1-Yn of table T1 in the terminal 18a, to

5   determine whether the determined time and/or date match or

fall within a range defined by that stored information. For

example, assuming that the controller 18 determines that the

call signal has been received at 8:30 A.M., and/or on a

particular date, and the information stored in memory

10   location Y1 of table T1 in terminal 18a specifies a time

period ranging from 8:00 A.M. to 9:00 A.M. and/or the same

particular date, then the performance of step 238 results in

the controller 18 recognizing that the determined time/date

corresponds with the time period/date specified by the

15   information from memory location Y1, and control then passes

to step 241 where the controller 18 correlates that memory

location Y1 to the corresponding memory location X1 from

column X, and copies the acoustic information from that

memory location X1 in the above-described manner (step 241).

20   Control then passes to step 242 where the method then

continues as described above.

In another embodiment, prior to the call signal being

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received by the terminal 18a, the party P1 may specify which

stored acoustic information he desires to be employed for

indicating the receipt of the call signal. For example,

prior to the call signal being received by terminal 18a in

5   step 232, the party P1 may enter command information into

the memory 18a (through keypad 22 and controller 18) of the

terminal 18a, specifying that the acoustic information

stored in memory location X1 be employed for indicating the

receipt of the call. Thereafter, assuming control passes

10   through steps 234 and 236 to step 238 in the above-described

manner, then the controller 18 performs step 238 by

recognizing the command information stored in the memory 24

by the party P1, and by then passing control directly to

step 241 (without performing the above-described decision in

15   step 238), where the controller 18 then correlates that

command information to the memory location X1, copies the

acoustic information from that memory location X1 in the

above-described manner (step 241), and performs step 242 as

described above.

20   In accordance with a further embodiment of the invention,

the selection of stored acoustic information can be made in

a random manner. For example, in that embodiment the

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controller 18 of terminal 18a includes a random or pseudo-

random number generator 18-b, and the controller 18 performs

step 238 (without performing the above-described decision in

step 238) by initializing the generator 18-b to cause it to

5   randomly or pseudo-randomly generate a random or pseudo-

random number. Thereafter, the controller 18 performs step

241 by correlating the generated number to a corresponding

memory location X1-Xn, such as memory location X1, from the

table T1 in terminal 18a, copying the acoustic information

10   from that memory location X1 (step 241), and by then

continuing the method at step 242 in the above-described

manner. Any suitable type of random or pseudo-random

generator may be employed as the generator 18-b in this

embodiment, such as, by example, a binary shift PN

15   generator.

It should be noted that although the invention has been

described in the context of the memory locations Y1-Yn

storing identifier information corresponding to only a

single user communication device, more than a single

20   identifier also may be stored in each memory location Y1-Yn,

in association with each respective memory location X1-Xn,

or some other desired configuration also may be provided for

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storing more than one user communication device identifier

in association with acoustic information from a particular

memory location X1-Xn. For example, identifier information

identifying a plurality of user communication terminals

5   relating to a particular category (e.g., "friends", "co-

workers") may be stored in a single memory location Y1-Yn

dedicated to that category, using any of the above-described

storing techniques. As such, when call signals that include

identifier information identifying any of the user

10   communication devices belonging to that category are later

individually received at the device 18a and correlated to

the corresponding information within the memory location Y1-

Yn in the table T1, in the above-described manner, a same

audible signal is generated in each case, based on the

15   acoustic information stored in the corresponding memory

location X1-Xn corresponding to that category.

A further embodiment of this invention will now be

described. In accordance with this embodiment of the

invention, a normalizing procedure is performed to acoustic

20   information in the communication devices 18a, 18b, 19a, 19b,

to enable any corresponding audible signals that are

generated to have amplitudes that are within a predetermined

range of amplitudes (and thus be normalized accordingly).

This procedure compensates for differences between the

amplitudes of recorded sound waves and desired amplitude

levels (and thus standardizes the volumes of generated

5   sounds).   Reference is now made to Fig. 5, which illustrates

a block diagram of a method in accordance with this

embodiment of the invention.   Step 300 of that diagram

preferably is performed when an audible signal or acoustic

information is entered into a user communication device,

10   such as in step 122 of Fig. 3a, step 224 of Fig. 4a, and

step 252 of Fig 4b.   For the purposes of this description

only, the method of Fig. 5 will be described in the context

of being performed in response to party P2 entering the

audible signal 21b' into the communication terminal 18b in

15   step 224, although it should be noted that a similar

procedure also may be performed in response to acoustic

information being entered in one or more of the steps 122

and 252 as well, and the method may be performed in other

devices 18a, 19a, 19b besides terminal 18b.

20   In step 300, in response to the audible signal 21b' being

entered into the microphone 21b of terminal 18b, and

eventually being converted to digital form by the A/D

converter 21a and provided to the controller 18 as acoustic

information (as in step 224), the controller 18 of the

terminal 21b performs a first predefined algorithm to

compute one or more acoustic characteristics of the inputted

5   signal, based on the digital values of the acoustic

information received from A/D converter 21a. Those

characteristics preferably include amplitude information

representing a maximum amplitude of the entered audible

signal 21b', and a minimum amplitude of the entered signal

10   21b', and are determined based on individual bits or words

(e.g., 16 bits) included in the acoustic information, using

any suitable, known algorithm. For example, the algorithm

may be performed by examining each 16 bit word received in

succession, maintaining a running tally of the minimum and

15   maximum values of all the received words, and maintaining a

running total of all values of the received words (i.e.,

each time a value of a next word is determined to be less

than a current minimal value, or greater than a current

maximum value, that new value is recorded as the new minimum

20   or maximum value, and is added to the running total). The

minimum and maximum values remaining after all of the words

have been received are considered to represent the minimum

and maximum amplitudes, respectively, of the entered signal

21b'. The first predefined algorithm preferably is

performed "on the fly", as a predetermined number of bits or

words are received in the controller 2a (prior to those bits

being stored in the memory 24 as described above).

5   Thereafter, in step 302 the controller 18 performs a second

predefined algorithm using both the maximum and minimum

amplitude values determined in step 300 and predetermined

information (pre-stored in memory 24) representing desired

maximum and minimum amplitude values, respectively, to

10   determine a scaling factor to be used in scaling the digital

values representing the entered signal 21b'. For example,

the second predefined algorithm may include the following:

    if omin = omax, then scaling factor = 1.0,

    else scaling factor = (dmax - dmin) / (omax - omin);

15   wherein omin and omax represent the determined minimum

amplitude and maximum amplitude, respectively, of the

audible signal 21b', and dmax and dmin represent the

predetermined maximum value and predetermined minimum value,

respectively.

20   Control then passes to step 304 where the controller 18

employs the determined scaling factor in a third predefined

algorithm to scale the digital values (now stored in memory

24) representing the entered signal 21b', to cause the

values to be placed within a range bounded by the

predetermined maximum and minimum values. For example,

5   according to one embodiment of the invention, the third

predefined algorithm includes performing, for each

individual word representing the audible signal 21b', the

following algorithm (ALG) for scaling the word:

$$w(i) = scaling\ factor*(w(i)-omin) + dmin \qquad (ALG)$$

10   wherein $w(i)$ represents an individual word, and omin and

dmin are defined as described above.

As an example, assuming that the controller 18 determines in

step 300 that the maximum amplitude value of the entered

audible signal 21b' is '150' and the minimum amplitude value

15   of that signal is '0', and the corresponding predetermined

maximum and minimum values are '300' and '0', respectively,

then the performance of step 302 results in a determination

that the digital values representing the entered signal

should be scaled by a factor of '2', and step 304 is

20   performed by multiplying those values by that factor '2'.

In this manner, the acoustic information representing the

entered signal 21b' is normalized in the memory 24.

Thereafter, the method continues (in step 224) in the above-

described manner. As a result of the normalization

procedure, when the acoustic information is later D/A-

converted and outputted again as an audible signal, the

5   signal will have an amplitude which is within a

predetermined range of amplitudes values (and a resulting

sound volume will be within a predetermined range of

volumes).

In accordance with another embodiment, the acoustic

10   characteristics obtained in step 300 are stored in the

memory 24 along with the inputted acoustic information, for

subsequent use in normalizing the acoustic information when

it is later retrieved for use in generating an audible

signal. For example, in this embodiment the steps 300 and

15   302 are performed in a similar manner as described above.

However, after the acoustic characteristics are determined

in step 300, they are stored in the same memory location as

the entered acoustic information, and are subsequently

included in the call signal later formed and transmitted (in

20   step 230). Thereafter, assuming control passes to step 254

of Fig. 4b in the above-described manner, then the

controller 18 of terminal 18a (after storing the received

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acoustic information in the memory 24 in step 252) performs

step 254 by extracting the acoustic characteristics included

in the received call signal (sent in earlier step 230),

performing the second predefined algorithm in the above-

5   described manner, using those characteristics (the maximum,

and minimum amplitude values) and predetermined information

(pre-stored in memory 24 of terminal 18a) representing

desired maximum and minimum amplitude values, and by

performing the third predefined algorithm in the above-

10   described manner, based on the scaling factor determined as

a result of the second predefined algorithm. The

performance of the third predefined algorithm causes the

scaling of the digital values (e.g., words) represented by

the acoustic information now stored in memory 24 of terminal

15   18a, and causes those values to be placed within the range

bounded by the predetermined maximum and minimum values.

Thereafter, step 254 is performed as described above, where

the controller 18 provides the normalized information to the

D/A converter 17a, which then responds by outputting a

20   corresponding analog signal to the speaker 17. The speaker

17 then generates a corresponding audible signal indicating

the receipt of the incoming call (step 254). In this

manner, the acoustic information is normalized in the

receiving terminal 18a, after being received from the

terminal 18b, and before being used to generate the audible

signal in terminal 18a.

It should be realized that although the invention is

5   described in the context of employing audible alerting

signals to indicate the receipt of incoming calls, the

invention is not limited as such. Where appropriate, the

teaching of this invention can also be applied to user

communication devices that employ any suitable device (e.g.,

10   a buzzer or a vibrator) for alerting a user of an incoming

call or message, using any suitable type of alerting

indicator.

Also, although not described above, it should be noted that

acoustic information which is stored in any of the devices

15   19a, 19b, 18a, 19b, 33, and 7 may have any desired format,

such as, e.g., a WAV file format (a CD-type audio sample

format), a MPEG-3 encoded format, an ITU standard G.711

encoded format, a G.723 encoded format, a G.729 encoded

format, an ETSI format (in the case of GSM voice encodings),

20   and/or other suitable, proprietary formats. Where

appropriate, the user communication devices 19a, 19b, 18a,

19b, 33, and 7 preferably also have any have a capability

for encoding/decoding such acoustic information using any

suitable types of encoding/decoding techniques.

Moreover, this invention may be employed in conjunction with

any suitable types of communication protocols, as was

5   previously described, and various protocol messages may be

modified to carry acoustic and other information in

accordance with this invention, such as for example, an

H.323 SETUP message, an H.323 OpenLogicalChannel message,

and a SIP INVITE message, used in Internet telephony, a

10   Q.2931 message used in ATM telephony, a SETUP message used

in GSM cellular telephony, and an IAM message used in ANSI

ISUP.

While the invention has been particularly shown and

described with respect to preferred embodiments thereof, it

15   will be understood by those skilled in the art that changes

in form and details may be made therein without departing

from the scope and spirit of the invention.